AF/C.C.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor :	William M. Radich	Appeal No. ---
Appln. No. :	10/607,967	
Filed :	June 27, 2003	Group Art Unit: 2133
For :	COMPUTATION OF BRANCH METRIC VALUES IN A DATA DETECTOR	Examiner: M. M. Chaudry
Docket No.:	S104.12-0037/STL 11305	

BRIEF FOR APPELLANT

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I HEREBY CERTIFY THAT THIS PAPER IS BEING SENT BY U.S. MAIL, FIRST CLASS, TO THE COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450, THIS 2nd DAY OF NOVEMBER, 2006.

PATENT ATTORNEY

Sir:

This is an appeal from an Office Action dated April 17, 2006 in which claims 1 to 20 were finally rejected.

REAL PARTY IN INTEREST

Seagate Technology LLC, a corporation organized under the laws of the state of Delaware, and having offices at 920 Disc Drive, Scotts Valley, California, 95066 USA, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment filed with the patent application and recorded on Reel 014254, frame 0731.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF THE CLAIMS

I. Total number of claims in the application.

Claims in the application are: 1-20

II. Status of all the claims.

A.	Claims cancelled:	---
B.	Claims withdrawn but not cancelled:	---
C.	Claims pending:	1-20
D.	Claims allowed:	---
E.	Claims rejected:	1-20
F.	Claims Objected to:	---

III. Claims on appeal

The claims on appeal are: 1-20

STATUS OF AMENDMENTS

No amendments were filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 is directed to a method of determining branch metric values in a detector. The method includes receiving time variant signal samples (T_k, r_k received in blocks 210 and/or 212 of FIGS. 2 and 3). Branch metric values are computed as a function of transition jitter statistics corresponding to the signal samples (branch metric calculation unit, within Viterbi detector/post processor 210, 212 of FIGS. 2 and 3, implements an example branch metric computation algorithm which is based at least in part on equations 1-38 on page 7, line 12, through page 17, line 9, of the Specification, which relate to transition jitter statistics).

Independent claim 11, which is similar to independent claim 1, is directed to a detector that includes branch metric calculation modules (branch metric calculation units within Viterbi detector/post processor 210, 212 of FIGS. 2 and 3) that can determine branch metric values by receiving time variant signal samples and computing the branch metric values as a function of transition jitter statistics corresponding to the signal samples (equations 1-38, and a related description, on page 7, line 12, through page 17, line 9, of the Specification).

Independent claim 20, which is similar to independent claims 1 and 11, is written in means-plus-function form and is directed to a detector (210, 212 of FIGS. 2 and 3, for example). Detector 210, 212 includes means for computing branch metric values as a function of

transition jitter statistics corresponding to signal samples received by the detector. An example means for computing the branch metric values is a branch metric calculation unit within an example Viterbi detector/post processor 210, 212 of FIGS. 2 and 3. The branch metric calculation unit utilizes/implements an example algorithm which is derived based at least in part on equations 1-38, and a related description, on page 7, line 12, through page 17, line 9, of the Specification.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

FIGS. 1 and 2-1 were objected to for not including a legend such as --Prior Art--.

Claims 1, 2, 7, 8, 11, 12, 17, 18 and 20 were rejected under 35 U.S.C. 102(b) as being anticipated by Kavcic et al., U.S. Patent No. 6,438,180, hereinafter referred to as Kavcic.

Claims 3-6, 9-10, 13-16 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kavcic.

ARGUMENT

I. Drawing objections

On page 2 of the Office Action, FIGS. 1 and 2-1 were objected to for not including a legend such as --Prior Art--. Specifically, with regard to FIGS. 1 and 2-1, page 2 of the Office Action states that "a figure is only acceptable without a 'Prior Art' label if that which is depicted incorporates the novel feature of the invention."

Appellant respectfully points out that FIG. 2-1 shows an example read channel 200 that includes data detection and recovery circuitry 204 (shown in greater detail in FIG. 2-2), which incorporates features of example embodiments of the present invention. Example disc drive 100, of FIG. 1, includes the example read channel of FIG. 2-1 and therefore the data detection and recovery circuit 204 of FIG. 2-2. Thus, FIGS. 1 and 2-1 incorporate novel features of the present embodiments and therefore are acceptable without a label of "Prior Art" according to the statement on page 2 of the Office Action. Thus, the objection should be withdrawn.

II. Rejection of claims under 35 U.S.C. §102(b)

On page 4 of the Office Action, claims 1, 2, 7, 8, 11, 12, 17, 18 and 20 were rejected under 35 U.S.C. 102(b) as being anticipated by Kavcic.

For a prior art reference to anticipate in terms of 35 U.S.C. 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) (Emphasis Added.)

The above requirement for anticipation is not met in the rejection of 1, 2, 7, 8, 11, 12, 17, 18 and 20 under 35 U.S.C. 102(b), based upon Kavcic, provided by the Examiner.

Independent claim 1 requires "receiving time variant signal samples" and "computing the branch metric values as a function of transition jitter statistics corresponding to the signal samples." (Emphasis Added.)

The Office Action suggests that since FIG. 2 of Kavcic includes a Viterbi detector 30 and a noise statistics tracker 34, the claim 1 limitation of "computing the branch metric values as a function of transition jitter statistics corresponding to the signal samples," is taught by Kavcic. Appellant respectfully points out that nowhere in the Kavcic reference is there any teaching of transition jitter statistics.

The Office Action, with no apparent basis, concludes that noise statistics tracker 34 of Kavcic deals with transition jitter statistics. As noted at the bottom of page 18 of the Appellant's Specification, transition jitter is a component of media noise and is dependent upon positions of data transitions. Kavcic does not address noise in connection with the position domain, but provides multiple examples (in columns 6 and 7) of branch metric calculations based on variations in amplitudes of pulses (signal dependent noise and correlated noise). Addressing noise in the amplitude domain, in a manner taught by Kavcic, does not produce transition jitter statistics.

Since Kavcic does not teach transition jitter statistics, every element of the invention of claim 1 is not identically shown by Kavcic. Thus, claim 1 is allowable.

Independent claim 11, which is directed to a detector, includes "branch metric calculation modules configured to determine branch metric values by: (a) receiving time variant signal samples; and (b) computing the branch metric values as a function of transition jitter statistics corresponding to the signal samples." (Emphasis Added.)

Kavcic teaches nothing about "branch metric calculation modules configured to

determine branch metric values . . . as a function of transition jitter statistics corresponding to . . . signal samples" and therefore independent claim 11 is also allowable.

Independent claim 20, which is directed to a detector, includes "means for computing branch metric values as a function of transition jitter statistics corresponding to signal samples received by the detector." (Emphasis Added.)

As noted above, Kavcic teaches nothing about transition jitter statistics. Therefore, claim 20 is not anticipated by Kavcic.

Dependent claims 2, 7-8, 12 and 17-18 are also allowable at least by virtue of their dependency, either directly or indirectly, from the allowable independent claims. Further, the dependent claims 2, 7-8, 12 and 17-18 set forth numerous elements not shown in the Kavcic reference.

III. Rejection of claims under 35 U.S.C. §103(a)

On page 7 of the Office Action, claims 3-6, 9-10, 13-16 and 19 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kavcic.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. In re Vaeck, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. §2143.

Under these criteria, the final Office Action fails to establish a *prima facie* case of obviousness of claims 3-6, 9-10, 13-16 and 19 based on the cited prior art.

For reasons provided above, Kavcic does not teach transition jitter statistics. Kavcic also does not suggest that feature. Thus, the third criterion for a *prima facie* conclusion of obviousness set forth in Vaeck is not satisfied. Consequently, dependent claims 3-6, 9-10, 13-16 and 19 are also allowable at least by virtue of their dependency, either directly or indirectly, from the allowable independent claims. Further, claims 3-6, 9-10, 13-16 and 19 set forth numerous elements not shown or suggested in the Kavcic reference. For example, claim 6 includes "a

derivation of transition jitter statistics is carried out from a Bayesian viewpoint, wherein transition jitter is treated as a random, nonlinear, nuisance parameter," which is not taught or suggested by Kavcic.

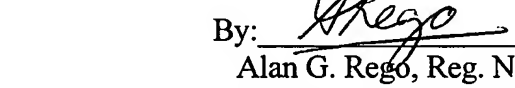
CONCLUSION

For the reasons discussed above, Appellant respectfully submits that independent claims 1, 11 and 20 are neither taught nor suggested by the reference cited by the Examiner. Also, Appellant respectfully submits that claims 2-10 and 12-19 are allowable as well by virtue of their dependency from allowable independent claims 1 and 11, respectively. Thus, Appellant respectfully requests that the Board reverse the Examiner and find all pending claims allowable.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

Alan G. Rego, Reg. No. 45,956
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3319
Phone:(612) 334-3222 Fax:(612) 334-3312

AGR:tkj

Claims Appendix

1. A method of determining branch metric values in a detector, the method comprising:
   (a) receiving time variant signal samples; and
   (b) computing the branch metric values as a function of transition jitter statistics corresponding to the signal samples.

2. The method of claim 1 wherein the transition jitter statistics comprise transition jitter variance.

3. The method of claim 1 wherein the computing step (b) further comprises computing the branch metric values as a function of wide-band additive noise corresponding to the signal samples.

4. The method of claim 1 wherein the computing step (b) further comprises computing the branch metric values as a function of hypothesized data sequences corresponding to trellis branches of the detector.

5. The method of claim 1 wherein the computing step (b) further comprises computing the branch metric values as a function of an equalized transition response derivative of the signal samples.

6. The method of claim 1 wherein a derivation of transition jitter statistics is carried out from a Bayesian viewpoint, wherein transition jitter is treated as a random, nonlinear, nuisance parameter.

7. The method of claim 1 wherein the detector is a hard decision detector.

8. The method of claim 1 wherein the detector is a soft decision detector.

9. The method of claim 1 wherein the detector is a part of a read channel of a disc drive data storage system.

10. The method of claim 1 wherein the detector is a post processor, which refines signals output by a primary detector.

11. A detector comprising:

branch metric calculation modules configured to determine branch metric values by:

(a) receiving time variant signal samples; and

(b) computing the branch metric values as a function of transition jitter statistics corresponding to the signal samples.

12. The apparatus of claim 11 wherein the transition jitter statistics comprise transition jitter variance.

13. The apparatus of claim 11 wherein the branch metric calculation modules are further configured to carry out the computing step (b) by computing the branch metric values as a function of wide-band additive noise corresponding to the signal samples.

14. The apparatus of claim 11 wherein the branch metric calculation modules are further configured to carry out the computing step (b) by computing the branch metric values as a function of hypothesized data sequences corresponding to trellis branches of the detector.

15. The apparatus of claim 11 wherein the branch metric calculation modules are further configured to carry out the computing step (b) by computing the branch metric values as a function of an equalized transition response derivative of the signal samples.

16. The apparatus of claim 11 wherein a derivation of transition jitter statistics is carried out from a Bayesian viewpoint, wherein transition jitter is treated as a random, nonlinear, nuisance parameter.

17. The apparatus of claim 11 wherein the detector is a hard decision detector.

18. The apparatus of claim 11 wherein the detector is a soft decision detector.

19. The apparatus of claim 11 wherein the detector is a part of a read channel of a disc drive data storage system.

20. A detector comprising:

means for computing branch metric values as a function of transition jitter statistics corresponding to signal samples received by the detector.

Evidence Appendix

None.

Related Proceedings Appendix

There are no known related appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.